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SHORT COMMUNICATION

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Taxonomic novelties in *Scapania*

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Abstract

Five new supraspecific taxa of Scapania are proposed, *S.* subg. *Gracilidae*, *S.* subg. *Pseudomacrodiplophyllum*, *S.* sect. *Americanae*, *S.* sect. *Hyperboreae*, and *S.* sect. *Simmonsia*.

Keywords

Scapaniaceae, nomenclature

Introduction

The northern temperate leafy liverwort genus *Scapania* (Dumort.) Dumort. was the subject of two comprehensive molecular phylogenetic studies (Vilnet et al. 2010, Heinrichs et al. 2012). These studies provided evidence for incongruence of the present supraspecific classification (Potemkin 2002) with the molecular tree topologies. Extensive morphological homoplasy hampers a morphological circumscription of several *Scapania* lineages identified in the molecular studies; however, several new combinations and taxa are needed to arrive at a monophyletic supraspecific classification (Fig. 1). In the following, the new taxa are introduced.

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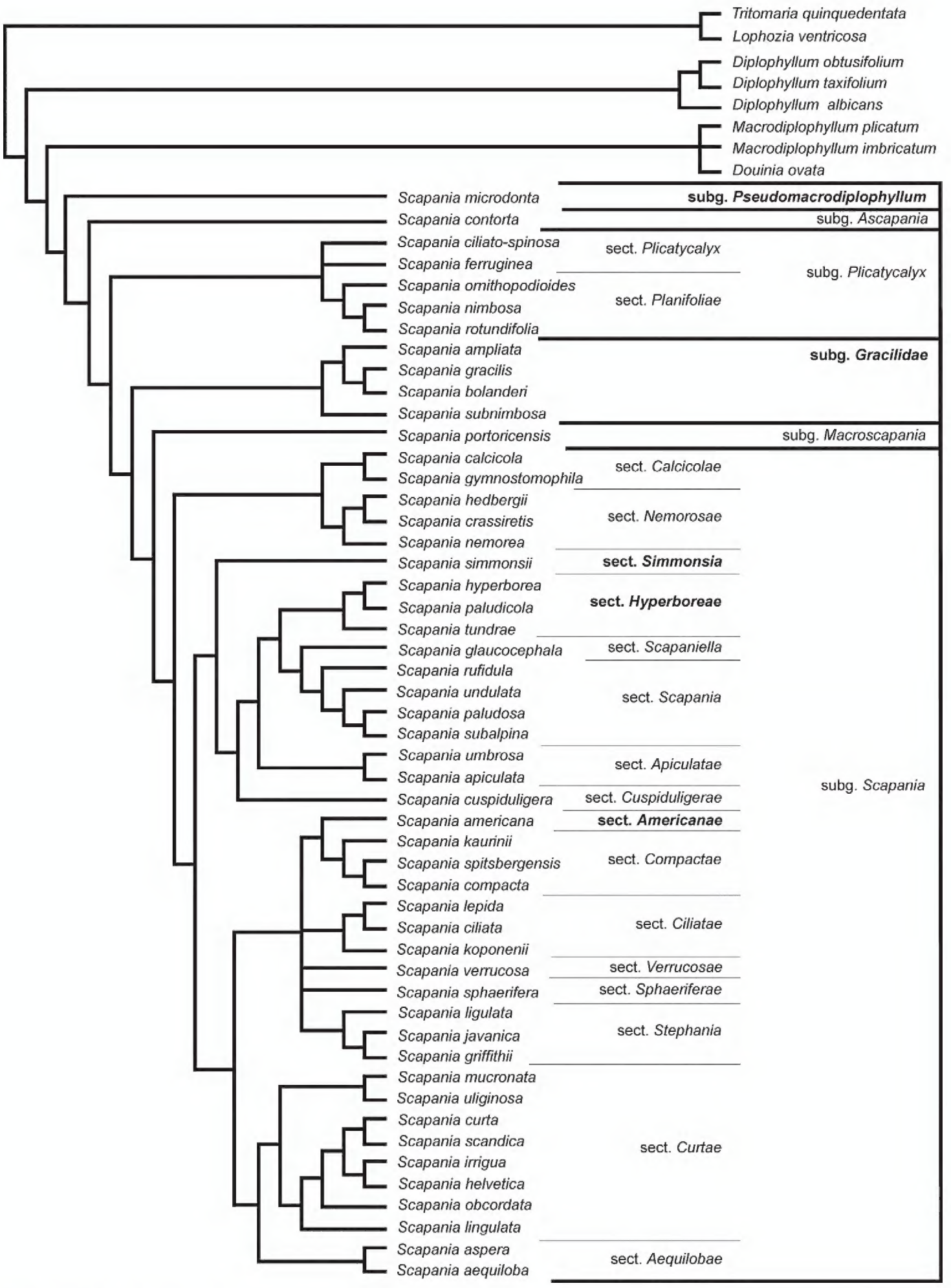

Figure 1. Phylogeny of *Scapania* with the new taxa indicated in bold. Modified from Heinrichs et al. (2012, Fig. 1).

Taxonomy

***Scapania* subg. *Gracilidae* (H. Buch) Váňa, Hentschel, Joch. Müll. & Heinrichs, comb. et stat. nov.**

Basionym. *Scapania* sect. *Gracilidae* H. Buch, Commentat. Biol. 3(1): 106. 1928.

Type. *Scapania gracilis* Lindb., Morgonbladet (Helsinki) 1873(286): 2. 1873.

Note. According to the molecular phylogenies presented by Heinrichs et al. (2012), *Scapania* sect. *Gracilidae* forms a lineage outside *S.* subg. *Scapania*; hence, we propose subgenus rank (Fig. 1).

***Scapania* subg. *Pseudomacrodiplophyllum* Váňa, Hentschel, Joch. Müll. & Heinrichs, subg. nov.**

Diagnosis. *Scapania* subg. *Pseudomacrodiplophyllum* includes species which differ from other *Scapania* elements by the presence of multicellular gemmae with intersecting walls, basal leaf cell walls with intermediate thickenings and pluriplicate perianths.

Type. *Scapania microdonta* (Mitt.) Müll. Frib., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 83: 262. 1905.

Note. *Scapania microdonta* [*Macrodiplophyllum microdontum* (Mitt.) Perss.] forms the sister clade to the rest of *Scapania* (Vilnet et al.2010, Heinrichs et al. 2012); hence, a new subgenus is introduced here to accommodate this species (Fig. 1).

***Scapania* sect. *Americanae* Váňa, Hentschel, Joch. Müll. & Heinrichs, sect. nov.**

Diagnosis. The new section of *Scapania* subg. *Scapania* is characterized by its type, the dioicous *Scapania americana* Müll. Frib. Distinctive features of *S. americana* and *S.* sect. *Americanae* are thick-walled, pigmented stem epidermis cells with thinner-walled cells on the ventral side of the stem, closely and sharply ciliate-dentate leaf-margins, with largest teeth up to five cells long and terminal cells considerably longer than wide, leaf-lobes that are usually decurrent beyond the level of the keel, a verruculose or striate-verruculose cuticle, and two-celled gemmae at the margins of unmodified leaves. The dorsal leaf-lobes often develop an undulate or folded base and may even show minute lobules or auricles.

Type. *Scapania americana* Müll. Frib., Bull. Herb. Boissier, sér. 2, 3: 44. 1902.

Note. *Scapania americana* is placed sister to *S.* sect. *Compactae* (Müll. Frib.) H. Buch with weak bootstrap support (Heinrichs et al., 2012). It differs from members of *S.* sect. *Compactae* by its dioicous condition; hence we place it in a new section rather than in sect. *Compactae*. In our current circumscription, *S.* sect. *Americanae* is mono-

specific, however, extension of the taxon sampling in forthcoming molecular studies may disclose further representatives.

Scapania sect. *Hyperboreae* Váňa, Hentschel, Joch. Müll. & Heinrichs, sect. nov.

Diagnosis. Species of *Scapania* sect. *Hyperboreae* resemble members of *Scapania* sect. *Curtae* (Müll. Frib.) H. Buch but differ by the presence of brownish to reddish gemmae, and a usually larger size.

Type. *Scapania hyperborea* Jørg., Förh. Vidensk.-Selsk. Kristiania 1894(8): 56. 1894.

Note. The presence of the type species of *S.* sect. *Irriguae* (Müll. Frib.) H. Buch, *S. irrigua* (Nees) Nees, in *S.* sect. *Curtae* necessitates the introduction of a new section for the remaining elements of *S.* sect. *Irriguae*. Molecular data so far supported the presence of *S. paludicola* Loeske & Müll. Frib. and *S. tundrae* (Arnell) H. Buch in *S.* subg. *Scapania* sect. *Hyperboreae*, as well as *S. hyperborea* (Vilnet et al., 2010; Heinrichs et al., 2012).

Scapania sect. *Simmonsia* (R.M. Schust.) Váňa, Hentschel, Joch. Müll. & Heinrichs, comb. et stat. nov.

Basionym. *Scapania* subsect. *Simmonsia* ["*Simmonsiae*"] R.M. Schust., Hepat. Anthocerotae N. Amer. 3: 612. 1974.

Type. *Scapania simmonsii* Bryhn & Kaal., Rep. Second Norweg. Arctic Exped. Fram 2 (11): 51. 1906.

Note. *Scapania simmonsii* forms an isolated lineage within *S.* subg. *Scapania*, hence, we erect a section for this species rather than using subsectional rank (Schuster, 1974). Distinctive features of the monotypic section are the deflexed-involute, broad, concave ventral leaf lobes that stand away from the stem at almost right angles and leaf cell walls with very large, nodulose trigones.

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References

Buch H (1928) Die Scapanien Nordeuropas und Sibiriens – 2. Systematischer Teil. Commentationes Biologicae 3(1): 1–177.

Heinrichs J, Bombosch A, Feldberg K, Kreier HP, Hentschel J, Eckstein J, Long D, Zhu RL, Schäfer-Verwimp A, Schmidt AR, Shaw B, Shaw AJ, Váňa J (2012) A phylogeny of the northern temperate leafy liverwort genus *Scapania* (Scapaniaceae, Jungermanniales). Molecular Phylogenetics and Evolution 62: 973–985. doi: 10.1016/j.ympev.2011.11.029

Potemkin AD (2002) Phylogenetic system and classification of the family Scapaniaceae Mig. emend. Potemkin (Hepaticae). Annales Botanici Fennici 39(4): 309–334.

Schuster RM (1974) The Hepaticae and Anthocerotae of North America. Columbia University Press, New York.

Vilnet AA, Konstantinova NA, Troitsky AV (2010) Molecular insight on phylogeny and systematics of Lophoziaceae, Scapaniaceae, Gymnomitriaceae and Jungermanniaceae. Arctoa 19: 31–50.